$$X_0 \quad X_1 \quad X_2 \quad X_3$$

ADD

$$Y_0 \quad Y_1 \quad Y_2 \quad Y_3$$

$$\rightarrow$$

$$Z_0 \quad Z_1 \quad Z_2 \quad Z_3$$

FIG. 1
PRIOR ART

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP   (303) 740-1980
Title: Executing Partial Width Packed Data Instructions
Inventors: Mohammed Abdallah, et al.
Filing Date: May 8, 2001
Application No.: 09/852,217
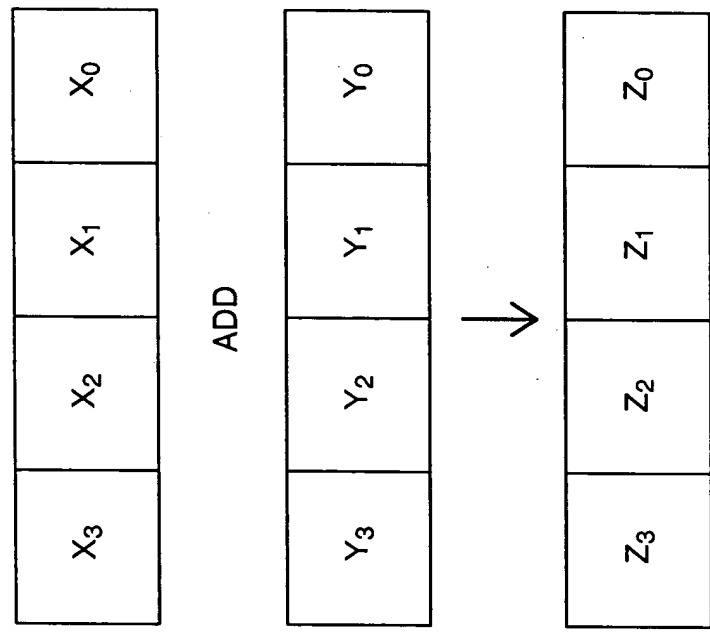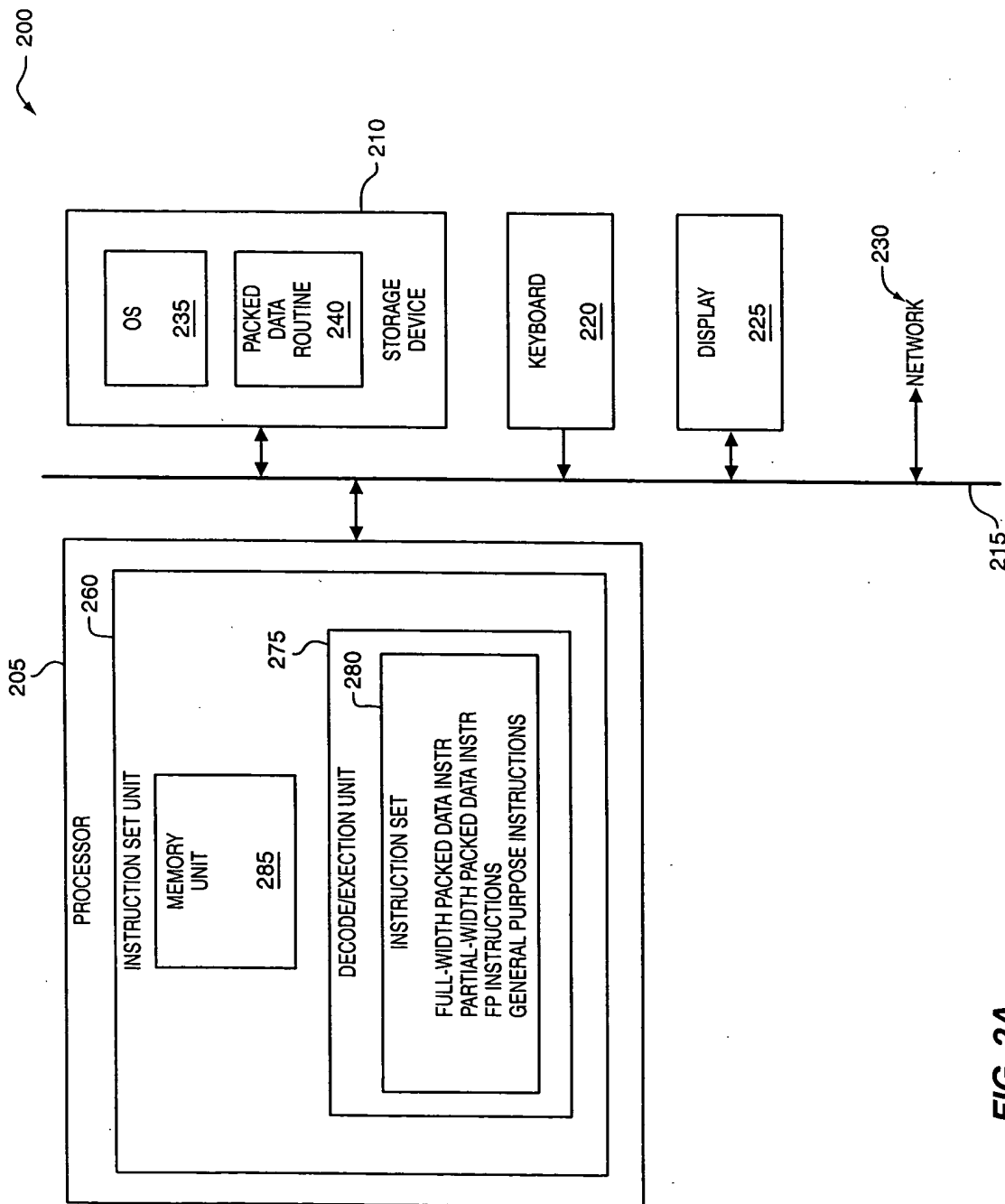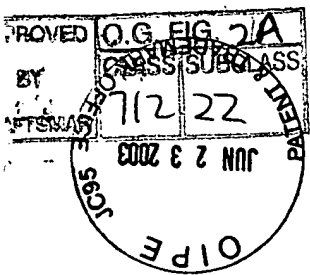Sheet: 2 of 13   Attorney Docket No: 42390P5193C

FIG. 2A
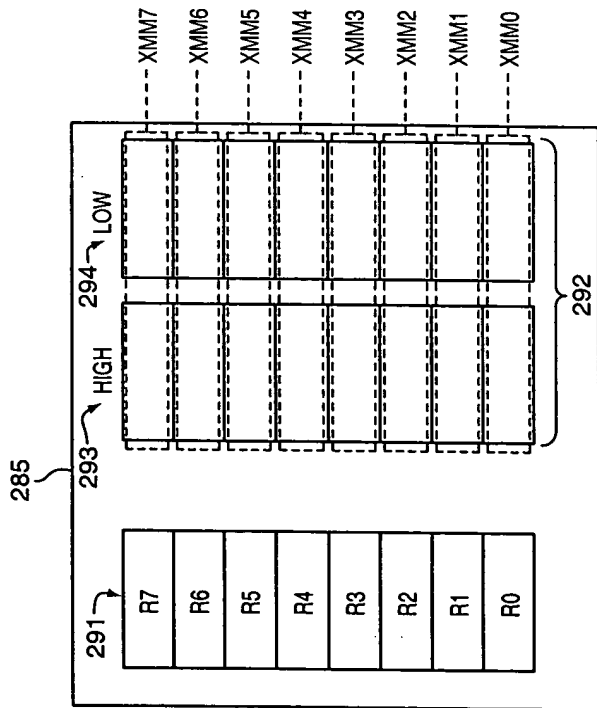
FIG. 2C

FIG. 2B

```
                    ┌─────────────────────────┐
                    │  INSTRUCTION PROCESSING  │
                    └─────────────────────────┘
                                 │
                                 ▼
                    ┌─────────────────────────┐
                    │   RECEIVE INSTRUCTION    │──── 310
                    └─────────────────────────┘
                                 │
                                 ▼
       FULL-WIDTH              ◇                    PARTIAL-WIDTH
       PACKED          ┌─────────────── 320         PACKED
                      ╱    TYPE OF    ╲
            ┌────────╱    INSTRUCTION   ╲────────┐
            │        ╲        ?        ╱         │
 330        ▼          ╲             ╱           ▼
  ┌───────────────────┐  ◇      ┌─────────────────────┐
  │ DETERMINE A RESULT BY │      │ DETERMINE A PORTION OF │
  │ PERFORMING THE OPERATION│    │ THE RESULT BY PERFORMING│
  │ SPECIFIED BY THE   │        │ THE OPERATION SPECIFIED BY│
  │ INSTRUCTION ON EACH PAIR│   │ THE INSTRUCTION ON A │
  │ OF CORRESPONDING DATA│ 340  │ SUBSET OF CORRESPONDING│
  │ ELEMENTS          │         │ DATA ELEMENTS       │
  └───────────────────┘         └─────────────────────┘
            │                             │
            │                             ▼
            │                   ┌─────────────────────┐
            │                   │ FILLING THE REMAINING │
            │                   │ PORTION OF THE RESULT │
            │              350  │ WITH ONE OR MORE     │
            │                   │ PREDETERMINED VALUES │
            │                   └─────────────────────┘
            │                             │
            └──────────────┬──────────────┘
                           ▼
                    ┌─────────────┐
                    │     END     │
                    └─────────────┘
```

FIG. 3

410	X_3	X_2	X_1	X_0

420	Y_3	Y_2	Y_1	Y_0

440	EXECUTION UNIT

430	X_3 OR 0	X_2 OR 0	X_1 OR 0	Z_0

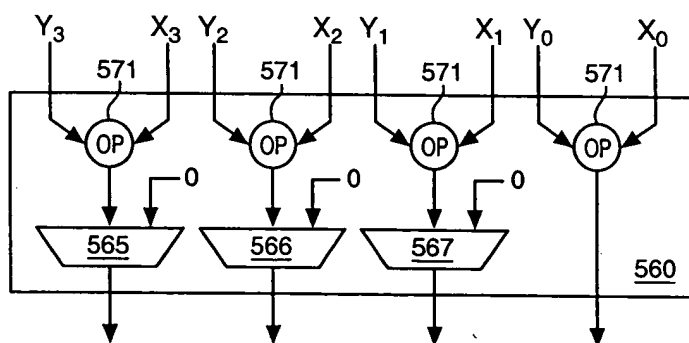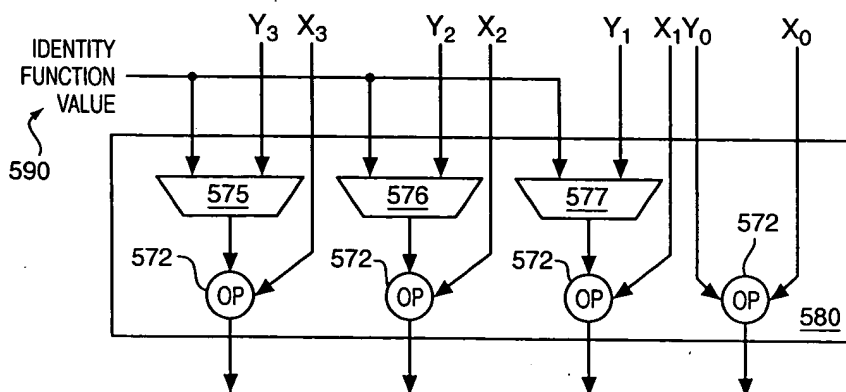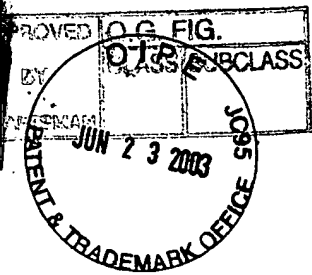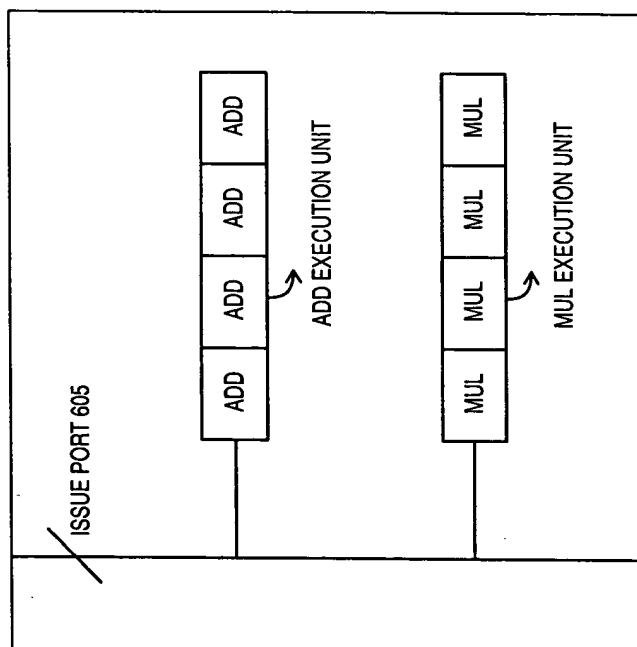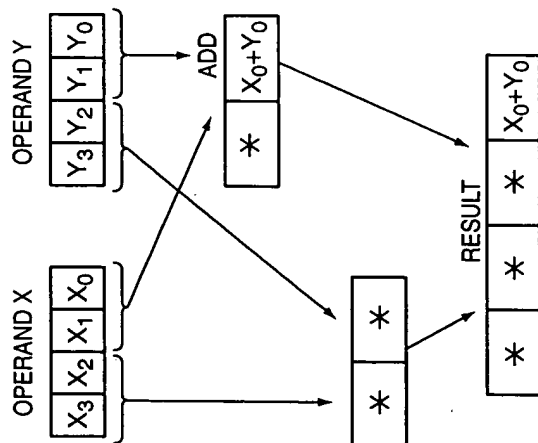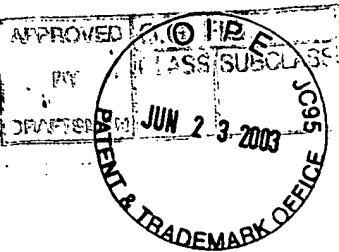*FIG. 4*

BLAKELY, SOKOLO TAYLOR & ZAFMAN LLP   (303) 740-1980
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Application No.: 09/852,217
Sheet: 6 of 13   Attorney Docket No: 42390P5193C

FIG. 5A

FIG. 5B

FIG. 5C

FIG. 6

FIG. 7B
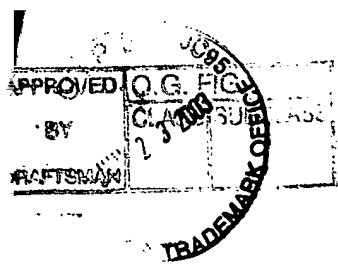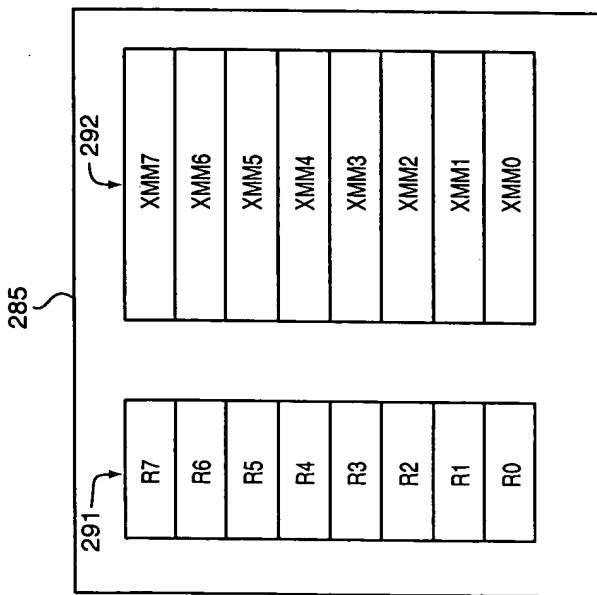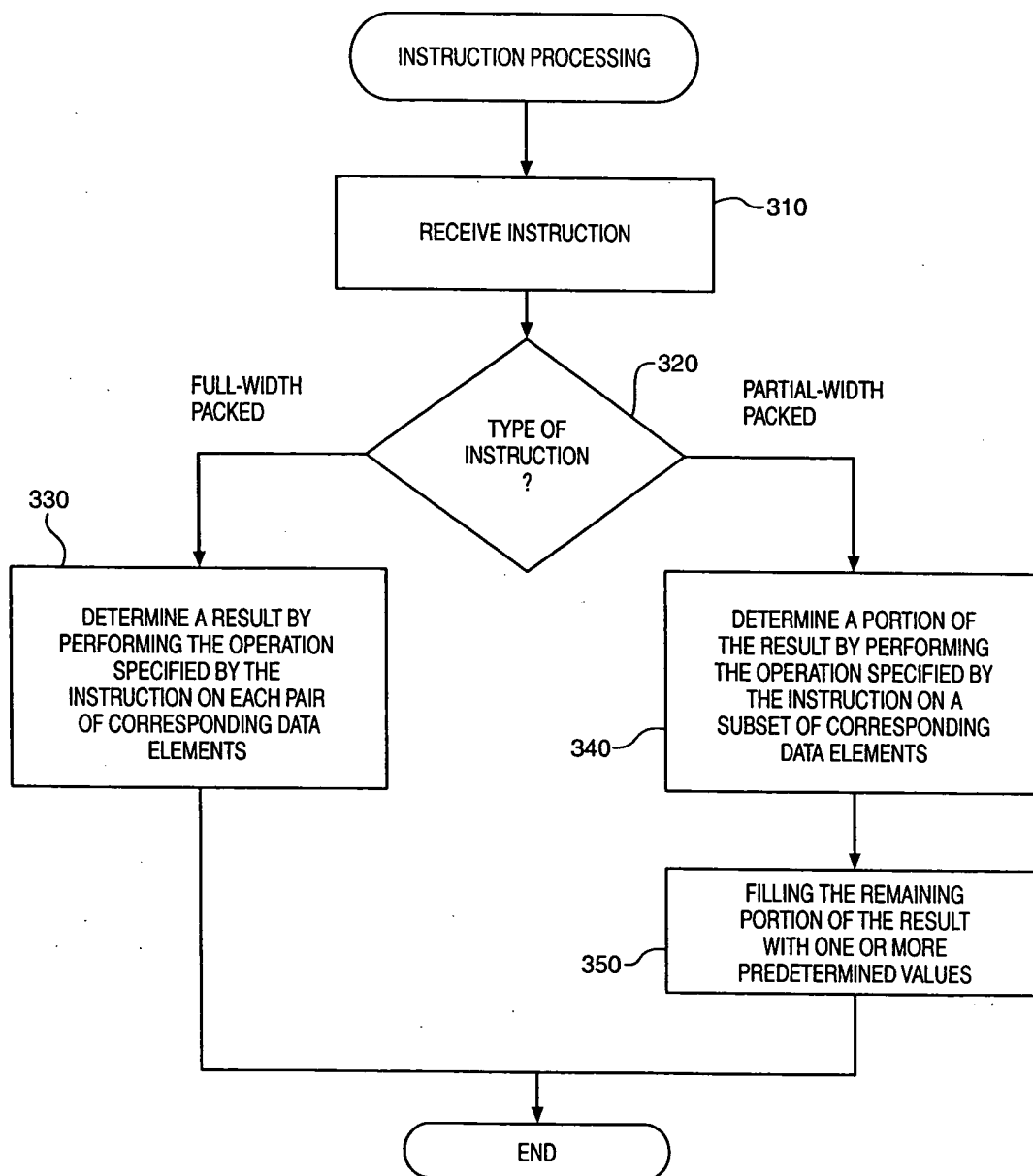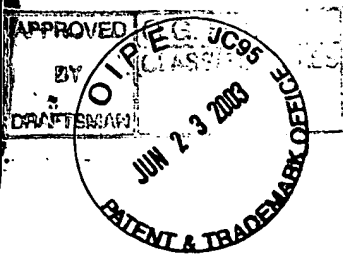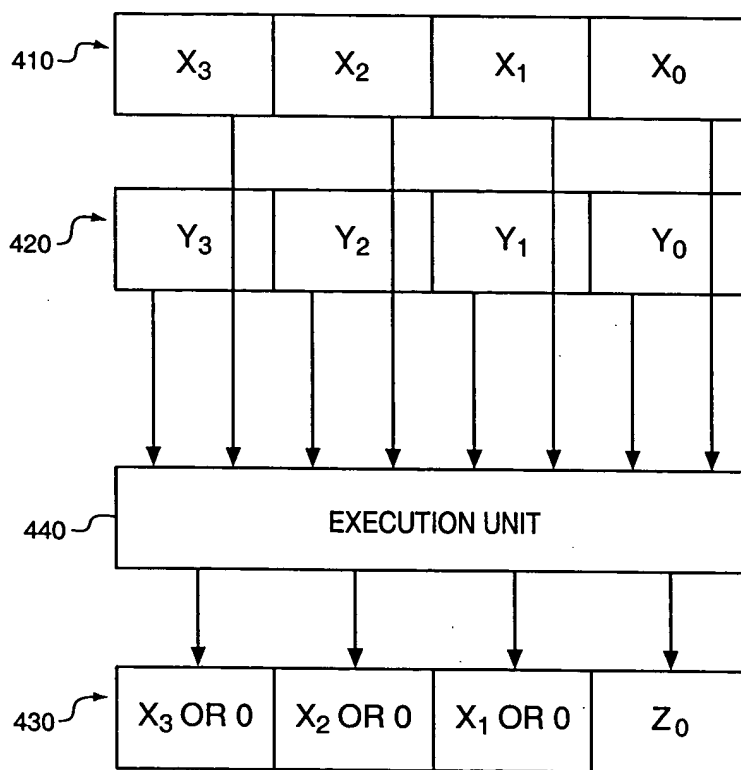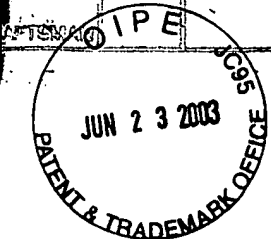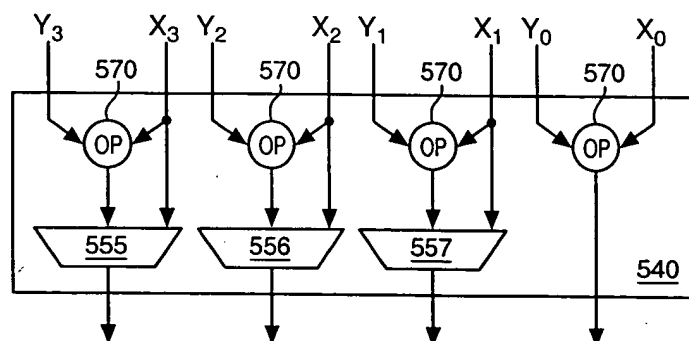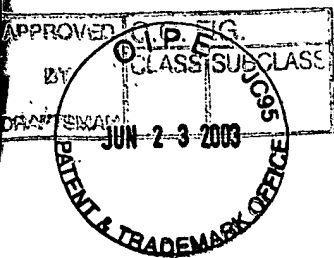
* = CORRESPONDING DATA ELEMENT
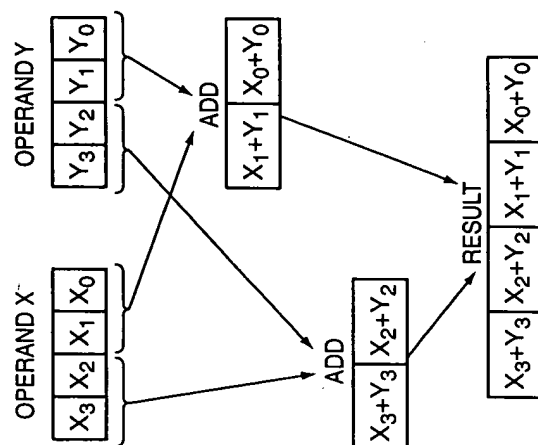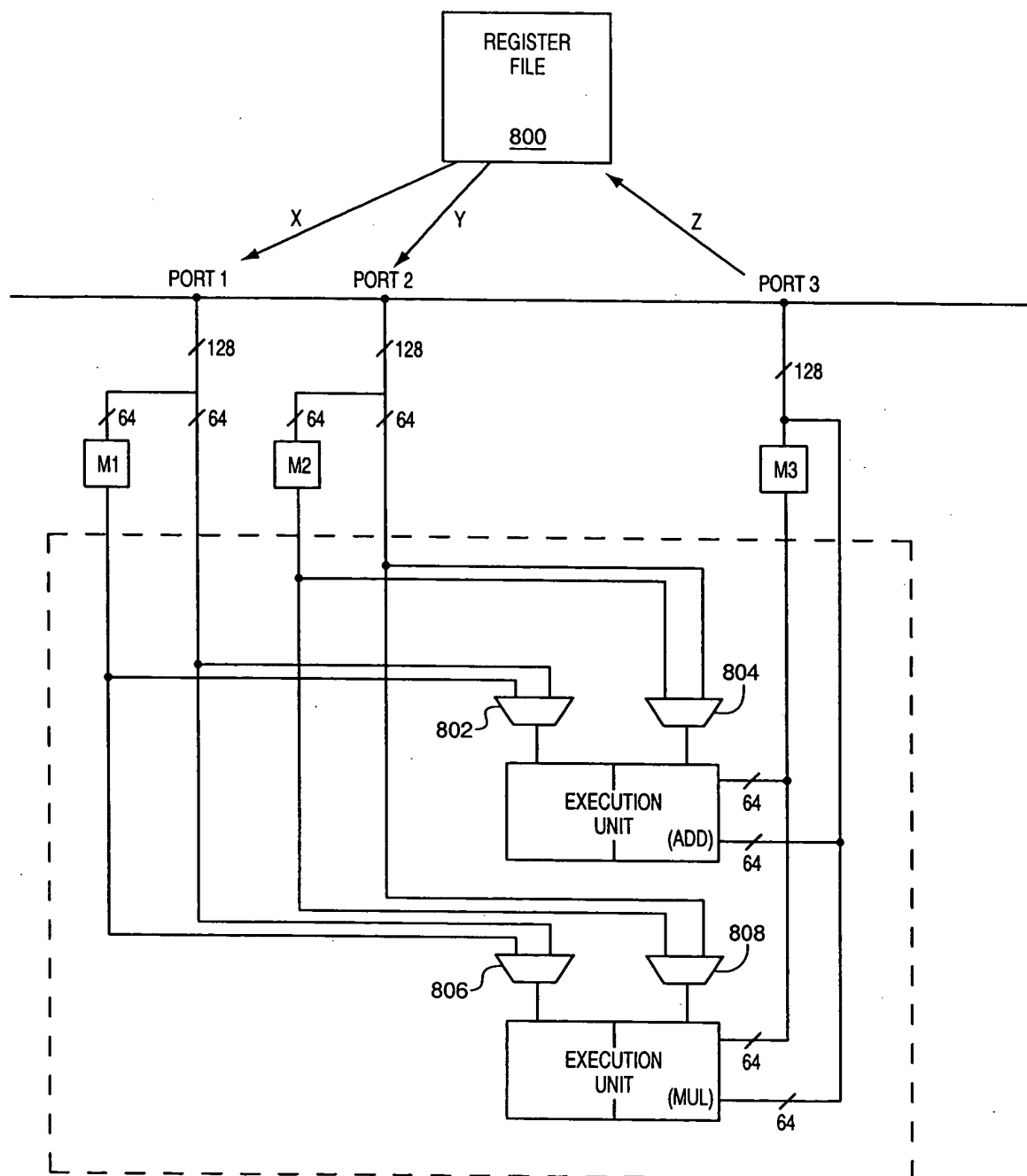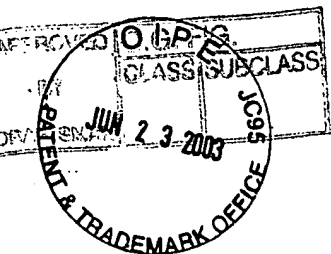IN X OR Y, NaN, 0, OR OTHER
PREDETERMINED VALUE

FIG. 7A

FIG. 8A
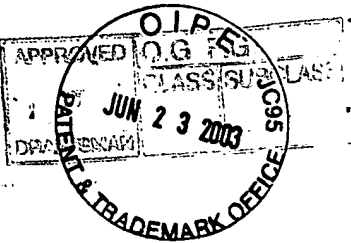
TIME	128-BIT INSTRUCTION	PERFORMED ON 64-BIT DATA
T	ADD X, Y	ADD X_0 Y_0 ADD X_1 Y_1
T+1		ADD X_2 Y_2 ADD X_3 Y_3
T+1	MUL X, Y	MUL X_0 Y_0 MUL X_1 Y_1
T+2		MUL X_2 Y_2 MUL X_3 Y_3

FIG. 8B
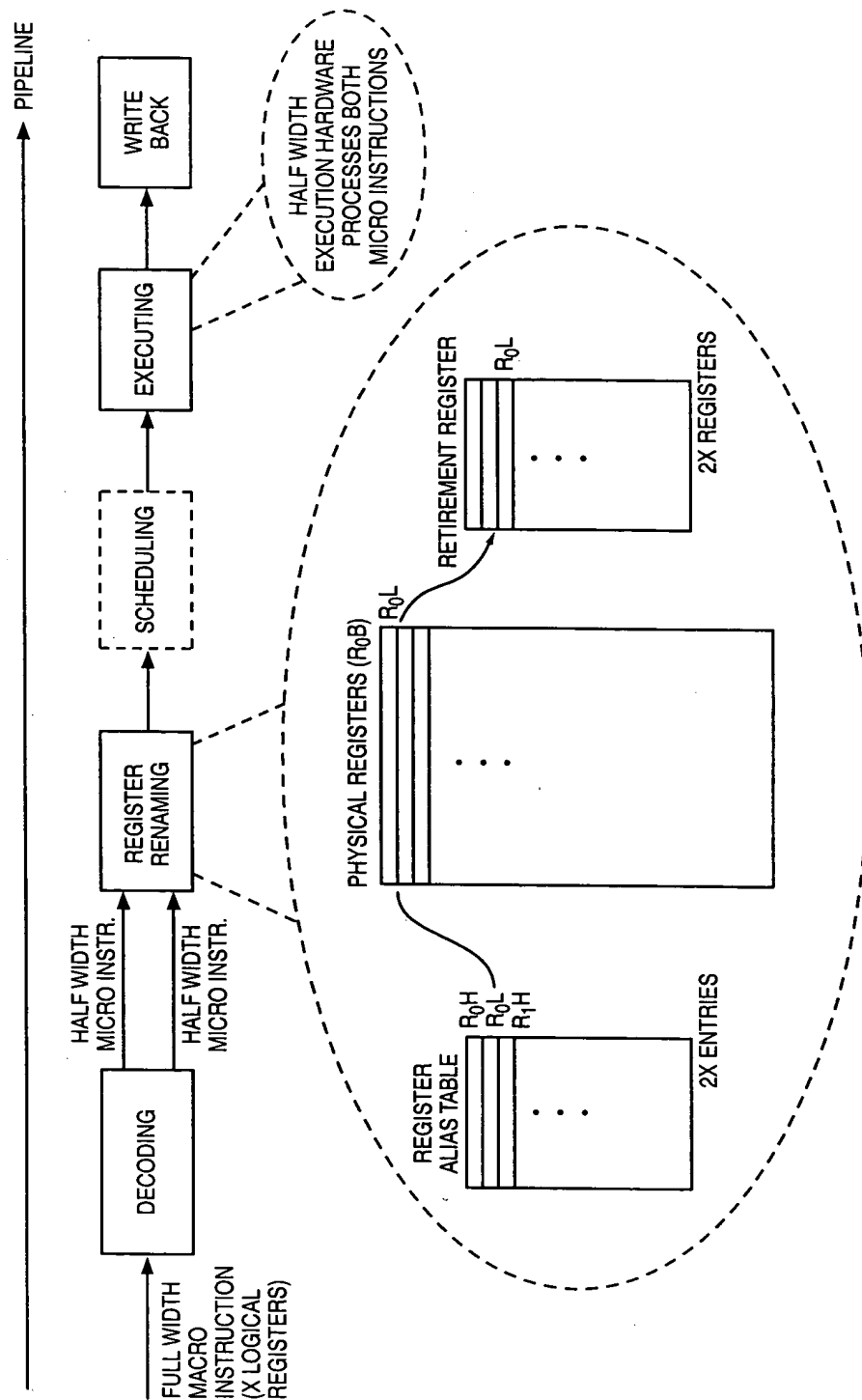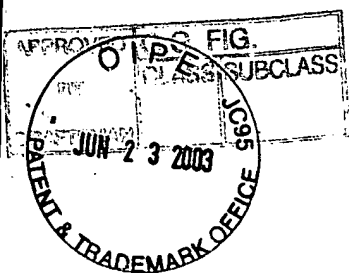
FIG. 9
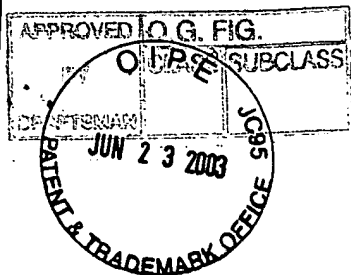
TIME	128-BIT INSTRUCTION	64-BIT INSTRUCTION
T	ADD X,Y	ADD X_L,Y_L
T+N		ADD X_H,Y_H

FIG. 10

FIG. 11